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PRODUCTS

Apparatus, Special, for Cleaning Producer Gas.

Apparatus, Special, for Gas Cleaning.

Apparatus, Special, for Production of Ammonium Sulphate (without Sulphuric Acid).

Apparatus, Special, for Production of Potassium Ferrocyanide.

Apparatus, Special, for Production of Sodium Ferrocyanide.

Boilers, Waste Heat.

Charging Machines.

Charging and Discharging Machines, Combined.

Condensers.

Conveyors, Hot Coke.

Discharging Machines.

Equipment, Special, for Gas and By-product Plants.

Fittings, Special.

Holders, Gas.

Plants, Blue Water Gas.

Plants, Carburetted Water Gas.

Plants, Coal Gas.

Plants, Coal Gas By-products.

Plants, Coke Screening.

Plants, for Manufacture of Ammonium Sulphate.

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Plants, for Recovery of Cyanogen.

Plants, for Recovery of Naphthalene.

Plants, for Recovery of Tar.

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BALTIMORE NEW YORK

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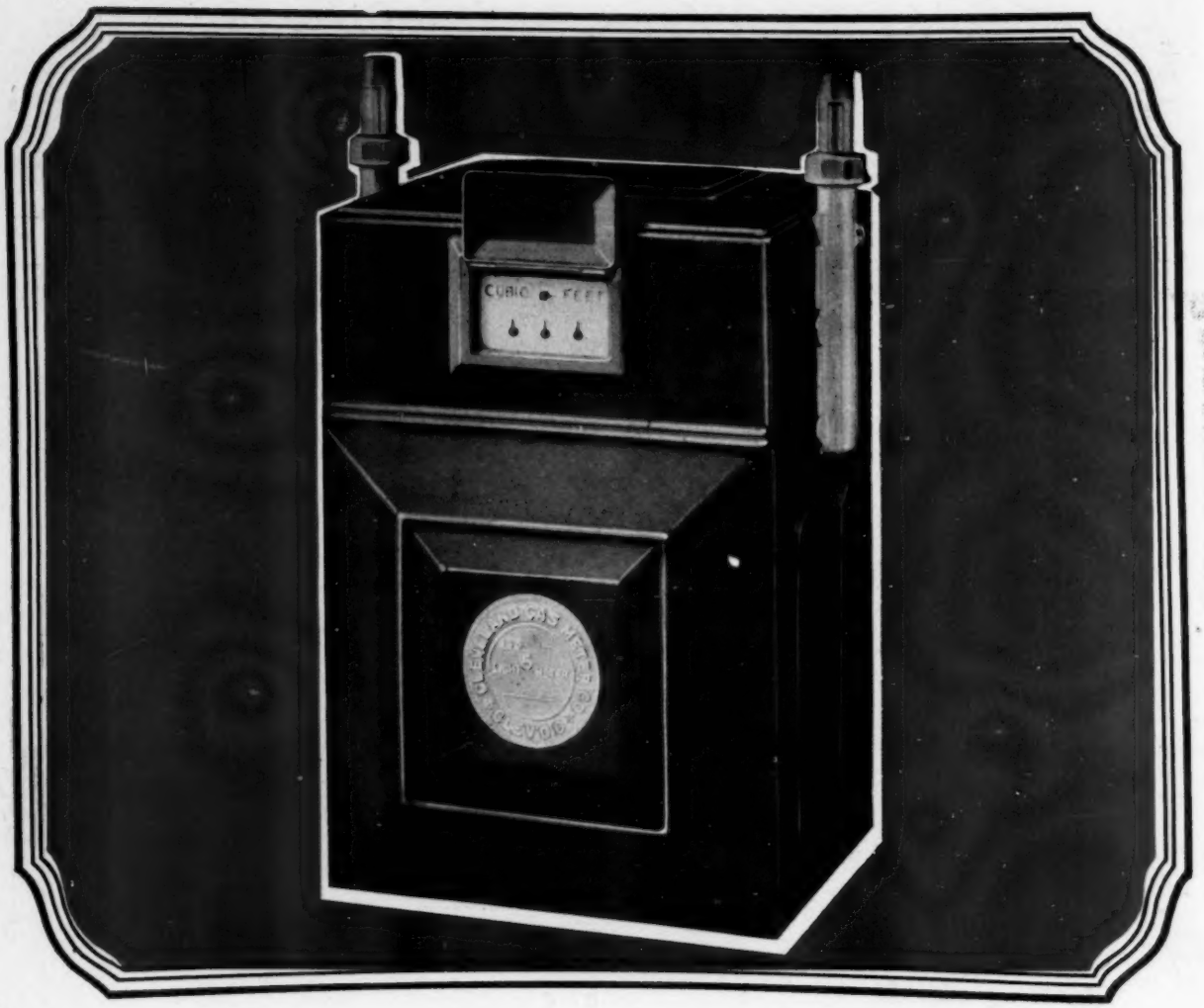

Dependability in a gas meter means a constant measure of reliable service; this is appreciated by the Superintendent, the Meter-reader and the Consumer.

Cleveland Gas Meters have a reputation for dependable service, the result of over thirty years' experience in manufacturing.

Our thoroughly organized and completely equipped factory assure you that the workmanship, materials, accuracy and general efficiency are unequaled.

"A" and "B" Types Meter Repairing

CLEVELAND GAS METER COMPANY

2180 East 65th Street **Cleveland, Ohio**

AMERICAN
GAS JOURNAL

Vol. 121. No. 28 NEW YORK, DECEMBER 13, 1924 Whole No. 3498

Fuel of the Future. What Shall It Be?

XVI. Heat treatment of metals—General details of the process

Ismar Ginsberg

IN the previous article of this series, the question of the use of gas in the heat treatment of metals was discussed from the purely economic standpoint. It was pointed out therein that this field was eminently one for gas and that inasmuch as the price of the fuel really did not matter very much in its selection for heat treatment of metal, gas did not have to fear any adverse competition from the cheaper fuels. The use of electricity for this purpose, it was shown, had gained great progress in spite of its excessive cost and solely because the electrically operated furnace gave such good results, that the manufacturer was perfectly content to pay the higher price for his fuel, making up the difference and more besides by reducing spoilage losses. Gas, it was indicated, now that the proper type of gas-fired furnace has been designed for this particular purpose, possessed all the advantages of electricity and was not as costly.

There is no question but that the manufacturer will be glad to save some money on his fuel bill and still obtain the same good, if not better, results by using the cheaper fuel. This forms the principal argument with which the industrial gas engineer and salesman can fortify himself when advancing to attack this hitherto unassailable field. This is the weapon that he should use in his sales arguments in favor of his fuel. It gives him the opportunity of applying an entering wedge and eventually forcing himself into the field.

Improvements in the Process Should Be Sought

In addition thereto he should also keep his eyes open and learn all the details of each individual heat treating job, so that he may be able to recommend improvements to the manufacturer. This will aid him greatly in selling his product and in keeping it sold. The function of the gas engineer in this field is, therefore, a double one. He must sell gas, and he must sell fuel economy and heat-treating efficiency at the same time. For, as gas is a more expensive fuel, it stands to reason that the inefficiencies that exist now in metal-treating plants, and, in fact, in all plants that employ fuels in manufacturing processes, will have to be overcome—and they can be overcome—in order to make even more attractive the use of gaseous fuel. It is not that gas does not possess distinct advantages over the solid and liquid fuels that are now being used in many manufacturing processes—advantages that in themselves should be and are sufficiently great to induce the manufacturers to adopt the more expensive fuel, but rather that the work of the industrial gas engineer would be greatly simplified and assistance rendered him if he attacks the problem from the standpoint of removing the inefficiencies that now exist in heating processes. In this way he will be able to show the manufacturer not only how to get better results in his heating process, how to control it better, and so on, but also actually how to effect economies, although using a more expensive fuel.

It is with this thought in mind that we wish to leave the purely economic phase of the heat treating business and turn to the discussion of the technical phase.

Industrial Engineer Must Understand His Problem

A word must be said at this point, before actually taking up the technical principles and details of heat treatment of metals, on the importance of the industrial engineer having a thorough understanding of the problem in hand, before he attempts to solve it or to recommend gas in place of another fuel.

There can be no greater setback than that which would be incurred by the gas engineer through lack of knowledge of the details of the process in which he is attempting to introduce gas. There can scarcely be anything more serious than his inability to answer the questions of the manufacturer whom he is trying to sell on gas. Such lack of information about the matter in hand would brand him at once in the mind of the prospective customer as being slipshod in his methods and as not being properly informed on what he is trying to do. The inevitable result would be that the manufacturer would refuse to trust him or his product and would be adamant in refusing, as he will put it, to take a chance on gas.

It must be borne in mind that when the gas engineer attempts to introduce his fuel into an establishment that is and has been using another fuel with success, as much as this may be, for a number of years, he will meet great inertia towards changing the method of working on the part of the manufacturer. There will be a decided reluctance to taking a chance with a new fuel. And the manufacturer cannot be wholly blamed for this attitude, for it is axiomatic in manufacturing establishments that improvements should not be made at the risk of destroying the productive capacity of the plant, which simply means that operations should not be stopped, except under the greatest of provocations, in order to experiment with something new. The gas man cannot expect to find anything else but opposition for this reason, and he must overcome this opposition and persuade the manufacturer that this is the one case in which he is justified in disturbing the operation of his plant in experimenting with the new fuel.

The Danger Involved

Hence, if on top of this difficulty and this reluctance on the part of the manufacturer to chance the disruption of manufacturing routine with the possibility of nothing gained thereby, if in addition he indicates to the customer that he does not possess a good knowledge of the process itself (which, in fact, must be more than a good knowledge, rather an accurate, detailed picture in mind of all the operations that take place, the conditions that govern them and the principles on which they depend), if, we say, he shows the lack of such knowledge, he loses his chance, perhaps for all time, of convincing the manufacturer that he can safely take a chance with gas as an industrial fuel.

Therefore, it behooves every gas engineer, before undertaking to talk to any industrial prospect, to become acquainted with that prospect's manufacturing process, particularly those stages in which heat plays a part. He must understand the basic principles on which the process has been developed, the factors that govern the results that are obtained by it, the character of the apparatus used in carrying it out, the exact details of the heating operation, what it is intended to effect by the application of heat, the amount of heat that is used, the nature of the fuel in present use and the probable adverse results that are obtained by the use of this fuel, the economy of the process, the amount of product that is spoiled and in fine all intimate details of the manufacturing operations. He must, in fact, know more about the process from the thermal standpoint than the manufacturer himself, and he will find that he will know more in nine cases out of ten after he has made such a careful study of the problem. The gas engineer is a thermal expert and in engaging to sell a prospect on industrial gas he has really volunteered his services to the manufacturer to go over his manufacturing operations, as they are now carried out, and study them from the thermal basis, so as to be able to recommend not only a new fuel, gas, in place of the ones being used at the present time, but also to advise him how to gain greater efficiency in the heating process.

The Importance of the Preliminary Survey

The necessity of making a preliminary survey of the proposition is therefore evident. This must be undertaken by the gas company and, even if it does not bring results at once, even if the customer cannot be sold in spite of all the care that was taken in the matter—which, of course, is possible, but not probable—the information gained can be put away for future reference and this labor will eventually bear fruit. In fact, some gas companies prepare these surveys with the idea of using them in the future, when local conditions become right for the introduction of gas as an industrial fuel in a local plant. There can be no real waste in making such studies and surveys, but if they are not made, and if the gas engineer is allowed to go off half-cocked—so to speak—and tackle the manufacturer without an accurate knowledge of the problem, irreparable harm may be done. In fact, it may be said, however incisive the statement might appear, that it were better not to try to sell industrial gas at all than to try to sell it without first acquiring the necessary knowledge about the enterprise in which it is desired to introduce the fuel. Of course, this does not pertain to certain special cases which have become more or less standardized at the present time, such as bread baking, wherein the principal factor is the oven used in the process.

Principles of Heat Treatment

The heat treatment of metals is both an art and a science. It is a science for the reason that the principles on which it is based have been clearly defined and it is an art for a certain amount of experience, skill and judgment are required in order properly to apply these principles and secure the best results in practice. All metals may be subjected to heat treatment and the principles on which the processes are based, while they may be identical in certain cases, still possess certain differences

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Outlook Uniformly Good

Stock exchange boom not representative of nation's economic condition--Good Christmas business expected

L. W. Alwyn-Schmidt

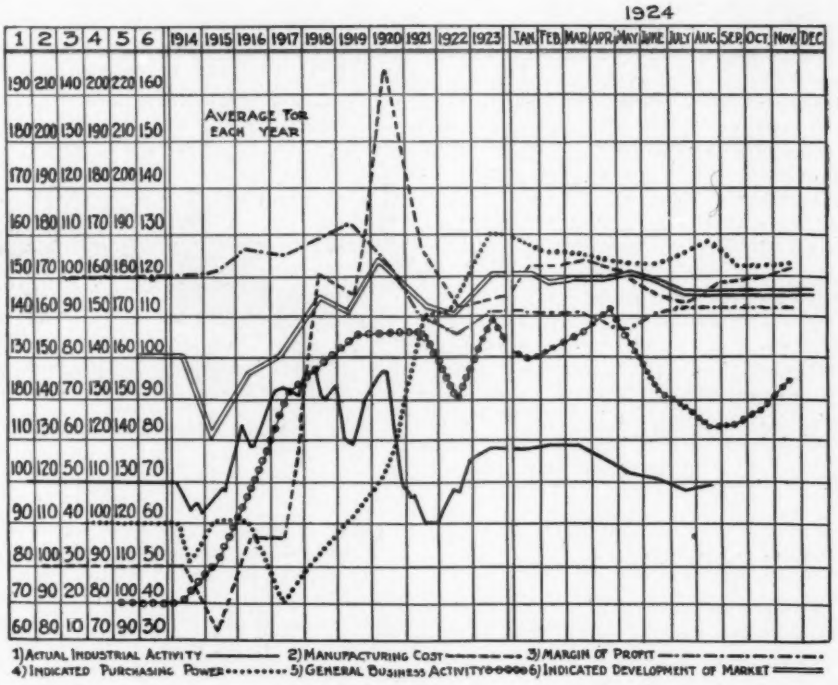
WE shall do well not to take at its full face value the activity of the stock exchanges, following the announcement of the result of the election. The exceptional transactions in the security markets will, no doubt, make for high clearing house figures during the following months, but they have no influence whatever upon the real economic situation of the country. This had taken a turn for the better some time before the election.

There has not yet been invented a political party who will let it rain when the corn needs rain or give us dry weather during the hay crop. Neither have we found as yet a cure for low or high prices by way of a political slogan. In fact, the influence of politics upon business appears to be more or less negative. If any deduction, therefore, can be drawn from the outcome of the recent election at all, it is that it will not negative the present healthy development of the market, but will leave it very much where it is. In addition, business men, no doubt, will welcome the intention of the President to give business a legislative rest.

Employment in the East

Economic recovery after having taken a firm hold upon the Western markets now begins to show its effect upon employment in the East. We have held all along that the recent decline did not result from any structural weakness of the market, but had its sources rather in the habitual receding movement following the rise of an economic wave of unusual force. This movement at the worst had to be of comparatively short duration.

Unemployment certainly was very considerable during a few months, but even if this is conceded it appears that the actual volume of production has been much higher than indicated by the employment statistics. Less men are required today to keep up a given rate of production than compared with 1914, which forms the basis of official employment statistics.


1924
1 2 3 4 5 6
1914 1915 1916 1917 1918 1919 1920 1921 1922 1923
JAN. FEB. MAR. APR. MAY JUNE JULY AUG. SEP. OCT. NOV. DEC.
AVERAGE FOR EACH YEAR
1) Actual Industrial Activity
2) Manufacturing Cost
3) Margin of Profit
4) Indicated Purchasing Power
5) General Business Activity
6) Indicated Development of Market

General Steadiness

The most outstanding feature of the present situation is its general steadiness. Rapid changes in the condition of the market produce as a rule violent fluctuations of the recognized indicators of market

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Here and There in Selling

Some ideas of interest to gas salesmen

William H. Matlack

THE gas man in seeking new ways to display his merchandise on sale frequently goes far afield and adopts display ideas that have proven successful with other merchandisers, yet when applied to the merchandising of gas appliances, fall short. The house furnishings dealer long ago conceived the idea of building a model home in his store for the display of furniture, draperies and kitchen equipment, and, it being a new idea, helped the sale of his merchandise. One of the first companies to have a house beautiful was the Consolidated Gas, Electric Light and Power Company, Baltimore; just how profitable this exhibit was we do not know, though we know that it has long since been abandoned, and this brings up the case of the all-gas kitchens.

Not so long ago an order was given by one of the principals in a holding company to all local managers to have a model kitchen installed in their display windows. The local managers had these model kitchens built and fitted up with such appliances as they sold and a few others that are found in up-to-date kitchens, yet which do not use gas. For the first few days after these displays were made, they attracted quite a little attention, but it soon waned and it was but a short time before it was discovered that several hundred dollars had been spent in building a kitchen window and several hundred more for appliances, that while akin to the gas range and water heater, consume no gas. The moral gained from this experiment is that while it is a fine idea to have a model kitchen, it should not be built into a display window. Folks soon get tired of looking at "the same old stuff." A show window that is not frequently changed is just as profitable in connection with the sale of merchandise as a standing advertisement in a daily paper which says "cook with gas."

Is It Really FREE?

There is dissension in the ranks of gas men on the idea of giving some sort of premium with the sale of every gas range and water heater during the past year and one-half. One man, who has had prize sales for the past two or three years, recently said: "What on earth am I to give as a premium with gas ranges now? We have given dishes, steam pressure cookers, aluminum sets, kitchen tables and one or two other things, and, as the matter stands now, we cannot sell a gas range or water heater unless we give some premium with it." Other merchandisers who are opposed to the prize package, yet who, due to pressure from within, have put on premium sales, are heartily sick of it, and one of the best merchandisers in the business said the other day: "The gas companies in many cities seem to be running wild on this premium business, and, as I see it, they are getting back into that period that I have called 'the dark ages,' when, in order to sell a gas range, the gas company gave the customer the range and one thousand feet of gas to get him to use it. I had hoped that the gas man had at last seen the light and up to a short time ago it seemed he had, and that he was selling gas service and appliances as any first-class merchandiser does, on the basis of service—what it will do for you." In some cities it is said that when a customer visits the gas company's office to make a purchase of a gas range or water heater, he will invariably ask: "Well, what are you giving away with ranges today?"

An Attractive Heater Display

If these men are correct, and it seems they are, there is much to be done to break down this condition. One way is to sell gas ranges and water heaters, as is, and at a price that will return a fair profit; sell them for what they will accomplish for the home manager, cutting out all the FREE stuff which, after all, has a string tied to it, and which trims the profit the gas company should have, in order to maintain its merchandising department, to say nothing of putting it in the class of those merchants who make it a business of running Horrible Sacrifice Sales.

That the gas man is giving more attention to window display there can be no doubt, for from all sections of the country come reports of special window displays. In some sections regular men are employed to keep the window freshly decorated and to be on the lookout for ideas for displays, and where this is done, where the windows are kept fresh and clean and new merchandise is exposed to sales each

(Continued on page 1273)

INDUSTRIAL GAS LESSONS

IF IT'S DONE WITH HEAT — YOU CAN DO IT BETTER WITH GAS

Lesson No. 49

Change of State *(continued)*

An Experiment in Specific Heat

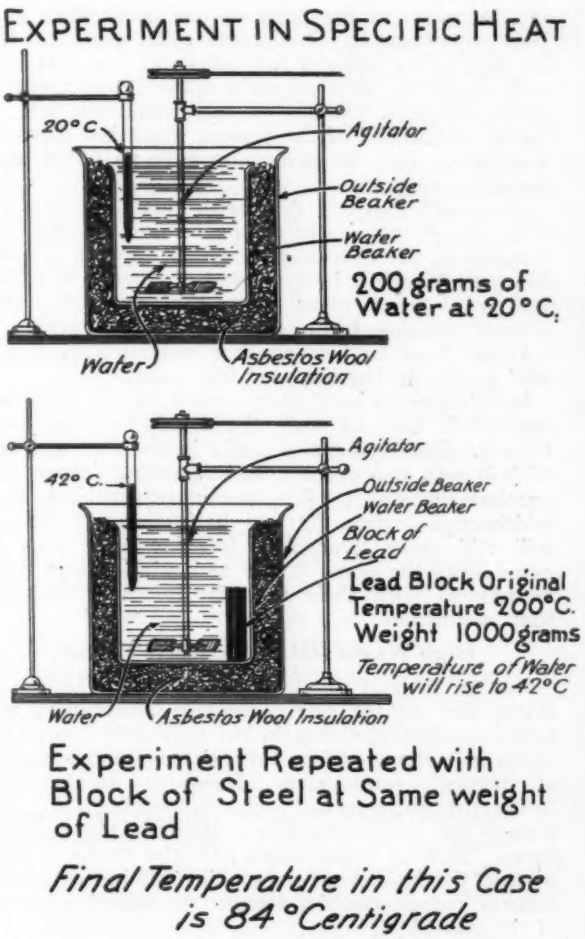
A very good example of the real significance of specific heat and its corollary thermal capacity is seen when different metals, heated to the same temperature, are added to a body of water. The water is contained in a beaker which may be placed in a much larger one and the intervening space may be filled with asbestos wool or some other insulator. A small stirring apparatus is set into the water and kept in rotation by means of a small electric motor. A thermometer is suspended in the water. The quantity of water is measured out and found to be 200 grams and the temperature 20 degrees C. A piece of lead is heated to a temperature of 200 degrees C. and is at once immersed in the water. The weight of the lead is 50 grams. The temperature of the water rises and will probably reach about 42 degrees C. Theoretically it should attain a maximum of 45 degrees C., but it does not do so, due to the loss of heat by radiation, etc.

Then the experiment is repeated with a block of steel, possessing the same weight as the lead and heated to the same temperature, 200 degrees C. The temperature of the water rises, but this time it goes beyond the point reached in the experiment with the lead. As all conditions were the same in both experiments and as all variable factors were maintained constant, the only explanation of the different result is that the block of steel contained more heat than the block of lead. The reason for this is that the specific heat of lead is about one-third that of steel and hence the 50 grams of steel at temperature of 200 degrees C. contained three times as much heat as the same weight of lead at the same temperature. Then, again, attention may be called to the fact that the addition of the hot mass of lead or of steel to the body of water served to raise its temperature to a slight degree only. This is due, not only to the fact that the weight of the water was less than that of the lead or steel, but more particularly to the fact that the specific heat of water is very much greater than that of either of the two metals.

In reality the specific heat of water is greater than that of any other substance, whether it is a solid, liquid or gas, and it is taken as unity, all other specific heats being less than this figure.

The Fundamental Equation of Heat Capacity

In order to raise the temperature of any substance, heat must be added to it, and to bring about a definite temperature rise a definite amount of heat, dependent on the nature of the substance, must be added. Hence the following equation may be written,



expressing the relation between heat and temperature rise in any substance:

$$H = k\ (t_2 - t_1).$$

In this equation, t_1 is the initial temperature of the body, t_2 the final temperature after the heat has

been added, H is the quantity of heat bringing about the change in temperature, expressed in B.t.u. in the English system and in calories in the metric system, and finally k is a constant dependent on the inherent character of the substance. It is called the heat capacity of the body, as explained above, and may be considered as the quantity of heat that is required to change the temperature of the body one degree of temperature, either Centigrade or Fahrenheit, according to the system of measurement employed.

OUTLOOK UNIFORMLY GOOD

(Continued from page 1263)

strength. But neither the sudden decline nor the more sedate upward movement have this time materially disturbed the balance of the market. This condition naturally cannot continue indefinitely. So far, increases in the price of one commodity have been counteracted by decreases in another. But the increasing demand for industrial raw materials will, no doubt, force an early upward movement all along the line. Prices of raw materials will be higher at the end of the present year than they are just now. This, in turn, must have an effect upon manufacturing cost.

How will industry deal with this development? Will it feel sufficiently strong to pass on the cost increase to the consumer, or will it think it a wiser policy to absorb it by improved production methods and leave retail prices where they are? For the present, opinion inclines to the latter course. So we may have to face another reduction of industrial profits during the next few months.

In solving this particular market puzzle, manufacturers will have to study the position of their customers. Employment is again in the increase and with it will also come a corresponding increase in purchasing power. But unemployment has been widespread during the last half year. Its effects will still make themselves felt for some time to come, until the wage-earner and salaried man have caught up with their financial losses during the past summer.

High Wages Not an Exclusive Factor

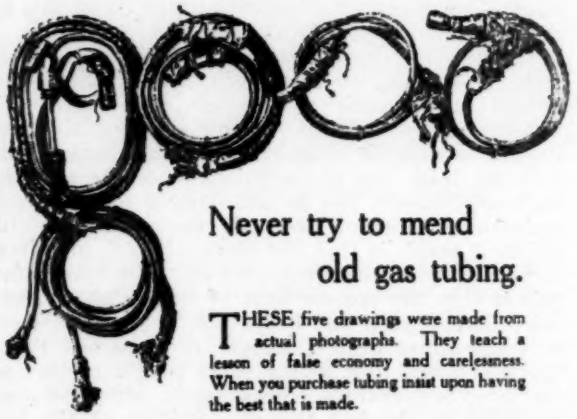
Let us keep in mind that high wages by themselves are not the sole factors in determining national purchasing strength, but that with it must be taken into consideration the existence and prospect of regular employment. Irregular employment forces the wage-earner to lay something aside for a rainy day and makes him cautious in his expenditures. Lack of employment puts the stress of supporting the family upon a smaller number of wage-earners, reducing in this manner the spending power of the individual.

Both together have a considerable influence upon the national purchasing power and will make it necessary, for a time at least, to follow a conservative price policy. This apparently has been realized by retailers and manufacturers alike, with the result that Christmas quotations do not show any advance over autumn prices.

GAS BILLS

W. T. Smith, adjuster in the Los Angeles office of the Southern California Gas Company, calls attention to the fact that gas bills vary in different months, due to a series of causes. What gas is actually used is recorded by the meter, and it may seem a discussion of a theoretical question to bring up the causes of greater consumption in one thirty days than in another. There are at least four factors which have a direct bearing upon the use of gas.

First, for a few weeks there may be visitors in the home, and although each uses only a little gas each day, yet in the time covered by a gas bill the effect might be felt. The same result would be produced by the family staying home more than is usual, around the gas heater. Second, winds, even when they are not extremely cold, tend to cool houses and call for more heat, and for higher gas bills. Just as a fan will cool a room, so a wind will reduce the temperature of an entire building and necessitate the use of more gas. The third and fourth factors, those of rain (and humidity in general) and of the temperature itself, are so generally understood that they need but to be mentioned. While any one of these causes might cause a change so slight as to be passed by, several of them coming together might affect the gas bill so that a careful manager of the home would ask for an explanation.



Never try to mend old gas tubing.

THESE five drawings were made from actual photographs. They teach a lesson of false economy and carelessness. When you purchase tubing insist upon having the best that is made.

No make of gas tubing is sold in Manhattan or Bronx Gas Offices until it has been thoroughly tested in our own laboratory. We insist on having the highest standard of quality.

With every Gas Heater and Gas Lamp we sell we furnish this high quality of tubing.

On each Gas Heater sold by us there is a safety cock which prevents the tubing becoming unloosened without personal effort.

Visit your Gas Office and obtain further information.

Consolidated Gas Company of New York

Geo. B. Cortelyou, President

A Warning of Prime Importance to the Gas User

As The Journal Views It

SALES STIMULATION

At the recent convention of the American Gas Association, in Atlantic City, the Commercial Section decided that it would undertake to work for a 50 per cent increase in gas sales during the next three years. The plans for accomplishing this end were to be perfected by the Gas Sales Stimulation Committee of the Commercial Section, which will bring to the attention of all the gas companies in the country various ideas and suggestions for increasing the sales of gas appliances, and thereby similarly increasing the sales of gas.

There is no question but this is one of the most important undertakings of the American Gas Industry today. There is no question but that the goal that has been set up is one that will be attained if the entire gas industry makes up its mind to work as a unit and put forth every effort to attain this object. There is no reason why it should not be attained. The gas industry today is one of the most powerful industries in the country and it should be able to do what others have done in other fields of far less importance and less influence than the gas field.

There are, of course, a great many plans of action that could be followed in this work. Sales of gas and gas appliances can be stimulated in many different ways, but there is no question that that method is best which serves to combine the efforts of all in a unit, so that by collective work not only is the industry as a whole benefited, but each individual part of the industry derives advantage from it, and there is no doubt but that by the adoption of a method of this character the best results can be obtained with the minimum of effort and lack of duplication.

It is therefore indicated that the gas industry prepare for a national advertising campaign along the same lines as have been carried out by other industries. This is essential in order to attain real results.

The fact that the national advertising plan has been used by large industries to increase sales of their products is well known, but it may not be so well appreciated that the results that these campaigns have yielded have proven so satisfactory that there has not remained the slightest doubt that the expense entailed therefor is justified in every way. Where publicity of such a character is indulged in there are bound to be worthwhile results. The entire industry, as a whole, is greatly benefited, and, in addition thereto, each individual business concern forming a part of the industry is materially assisted in selling its product.

The relation between gas sales stimulation and national advertising is a close one. In fact, it would seem that the most potent factor, tending to promote greater sales of gas and gas appliances, is the attainment of publicity on a national scale. It has produced results in every other case. There is no reason why it should not produce similar results in the case of gas.

A word of caution must, however, be uttered at this point. In undertaking a national advertising campaign for the purpose of stimulating gas sales it is essential that the work be done on a large scale. Large expenditures are entailed and must be met. It is hardly worth while trying to conduct national advertising on a small scale. The very nature of the undertaking marks it out as one of large proportions. There can be no question about this. It involves many thousands of dollars. The time has come when the gas industry must consider very seriously whether it can afford not to undertake national advertising on the approved big scale.

The details of the plan which could be successfully pursued in national advertising of gas and gas appliances are not so difficult in themselves as they are many and of varied nature. There is no question but that a proper merchandising plan can be devised for gas, as it has been for the other industries. The use of a catchy slogan is of considerable importance.

The time seems ripe for the undertaking of national advertising by the gas industry. Steps have been taken in that direction, and it may be that the near future will see the inauguration of a plan of publicity which will go far towards helping gas attain its goal.

A Sales Drive for Gas Appliances

How it was organized and what it accomplished

Charles W. Geiger

THE gas appliance drive in California, under the heading of Gas Equipment Exhibit for Better Homes, which was held the early part of this year, was the greatest drive for gas appliances in the history of the industry. The drive was under the auspices of the Gas Appliance Society of California. This society is a co-operative sales organization, covering all branches of the industry. Its object is to establish a spirit of fraternity between its members by social intercourse and the exchange of information, the extension of more cordial and friendly relations between manufacturers, jobbers, distributors, retailers, gas companies and consumers, to the end that every home will be fully equipped with modern gas appliances.

How the Drive Was Organized

Long before the drive, the Gas Appliance Society had made preparations for assisting the retailers in every way possible. A series of bulletins was prepared and sent out to 4,000 dealers through the state. The first bulletin was sent out 30 days before the drive, and told the retailer how he could tie in with the Gas Equipment Exhibit for Better Homes, and related what he would gain from the exhibit. The second bulletin was sent out about a week after the first one. This bulletin was known as the advertising bulletin and contained a number of advertising suggestions for the Gas Equipment Exhibit. The suggested advertisements were prepared with a view of creating a reader interest in the recognized space of time, 15 seconds. Each of these suggested advertisements was headed with an illustration. That was to catch the eye. Then followed a caption, or line of reading, which was intended to register reader interest. This was followed by the argument in favor of gas appliances.

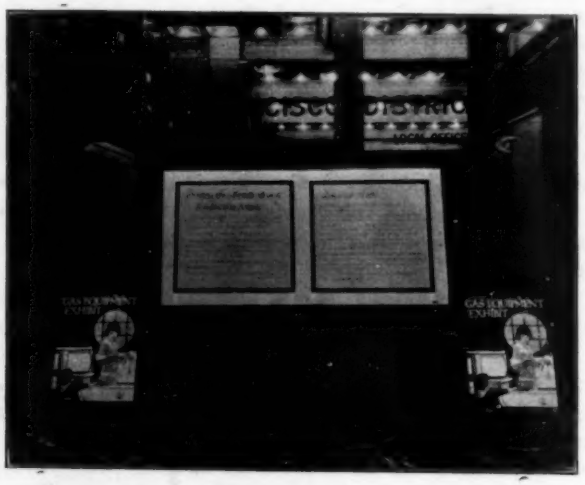
"The industries which show the greatest increase in sales are the industries that are selling what the article will do, rather than selling price, and in the suggested advertisements in each case this was the thought back of the advertisement. While the price will always be a factor, it is not the most important factor. What the article will do is the determinant factor. If the retailers feature the necessity of gas appliances, rather than price, making price secondary, the returns will be much greater than if price alone is the argument." This was the keynote idea of the drive.

The Window Display

A week after the second bulletin had been sent out the third bulletin was mailed, which gave expert suggestions as to how to trim windows with gas appliances. This bulletin showed ten beautiful window displays, and gave expert advice as to the placing of merchandise, and included diagrams showing just where each article was to be placed, what materials were required, as accessories, and the cost of installation.

mentioned, we have not had any sign or trace of naphthalene, and this source of ordinary difficulty has been entirely eliminated in our distribution system and metering equipment.

During the past year we have expressed our approval of vertical retorts in a way much more forcible than words can express it, by the addition of a third bench to the two existing benches. This will increase our rated capacity for coal gas manufacture to 600,000 cu. ft. per day and actual capacity to over 720,000 cu. ft. per day.



Special stories, signed articles and editorials were prepared by the Gas Appliance Society and furnished, not only to the press, but to the dealers, who urged their local newspapers to run them in reading columns during the week. Three preliminary feature releases were sent to the newspapers in the state. These were handled by newspaper syndicates, direct with the papers.

Posters

The Gas Appliance Society furnished free of charge to the retail dealers of the state two thousand beautiful posters which served as "stop spots" to the prospective customers. This poster was on heavy cardboard, size 19x26 inches, and was placed in a conspicuous place in the window, to lead the eye

(Continued on page 1273)

Catechism of Central Station Gas Engineering in the United States

Installment No. 49.

(Continued from last week)

Cerium has the property of combining with oxygen in two different proportions, and Killing, a German chemist, has advanced the theory that under the action of heat the ceria in the mantle becomes alternately the higher and the lower oxide of cerium, thus absorbing and setting free oxygen. The oxygen set free is liberated at the surface of the mantle, the very point at which its effect in increasing the temperature of the flame will be most efficient in raising the mantle to a higher temperature. And since the light emitted by an incandescent body increases rapidly as the temperature of the body rises, the higher the temperature to which the mantle is heated the greater the amount of light it will give out. Dr. Bunte, another German chemist, took a different view of the way in which the effect is produced, and held that instead of actually combining with the oxygen the ceria simply condenses upon its surface the molecules of oxygen and thus makes them available for combination with the gas in a manner similar to that in which platinum acts when used in the form of platinum black in the self-igniting devices recently put on the market. The final effect of the action of the ceria is the same, no matter which view is assumed as being true, and is to increase the flame temperature of the gas, and, consequently, the temperature to which the mantle is raised, by making the combustion take place to a certain extent in an atmosphere of oxygen and so decreasing the amount of nitrogen that has to be heated for any given volume of gas consumed.

As a result of further research, and especially of some experiments upon the comparative temperatures of the naked flame of an incandescent burner and of a mantle heated by this flame, Dr. Bunte has abandoned the theory explained above, and now believes that the efficiency of incandescent gas lights is due to the selective radiation of the materials of which the mantle is made.

Light Producing Component of Gas

264. Upon what property of illuminating gas does the amount of light that it will give per cubic foot when used in an incandescent burner depend?

Ans. The authorities on the subject differ in their views as to the property of illuminating gas upon which depends the amount of light that it will give per cubic foot when used in an incandescent gas burner.

As a result of work done in connection with the Michigan Gas Association Scholarship in the University of Michigan, Messrs. White, Russell and Traver concluded that, other conditions being the same, the amount of light given per cubic foot by a gas when used in an incandescent gas burner was proportionate to the calorific value and increased at the rate of one candle for each increase of four calories, or 15.87 B.t.u. in the calorific value per cubic foot. In their experiments they used an ordinary "C" Welsbach burner and a Welsbach mantle. The amount of gas as well as that of the air used with each gas was adjusted so that the maximum total amount of light was obtained, as they found that this condition corresponded with the maximum efficiency, that is, the giving of the maximum amount of light per cubic foot of gas consumed. The gases experimented with ranged from blue water gas to Pintsch oil gas.

International Commission Report

After making a number of experiments with gases of different calorific values, the results of which were reported in 1903 to the International Commission on the Photometry of Incandescent Gas Burners, M. Sainte-Claire Deville also reached the conclusion that the lighting effect produced by gas used in incandescent burners was, apart from differences in the mantle, proportional to the calorific value of the gas.

On the other hand, Dr. H. Bunte reported to the International Gas Congress, held in Paris in 1900, that he had found that gases differing widely in their calorific value gave practically the same results when used in incandescent burners. In the experiments on the result of which the statement was based, the same burner was used without any adjustment either of air or gas, and as this burner was designed for use with a gas of comparatively low calorific value, it did not give for the gases of higher calorific value the results that can be obtained when they are burned under proper conditions, and, therefore, the conclusion of Dr. Bunte is hardly justified.

Prof. V. B. Lewes holds that the flame temperature is of more importance than the calorific value of a gas in determining its efficiency in an incandescent burner, since the amount of light thrown off by any given incandescent material depends upon the temperature to which it is heated. On this basis the amount of air required for and the amount and character of the products formed by the combustion of the gas and the volume of the space in which the combustion of a unit volume of this gas is completed are as important as the calorific value. In the lectures in which he set forth these views Professor Lewes gives the results of experiments showing a duty of 19 to 20 candles per cubic foot

from blue water gas when burned in a special form of Argand burner without any pre-admixture of air.

Temperature of Incandescent Body

That the temperature of the incandescent body has an important influence upon the amount of light that it will give out is shown, among other things, by experiments made by Messrs. White, Russell and Traver, the results of which are given in the report mentioned above, and by the increased duty per cubic foot of gas which is obtained with the same gas and the same incandescent material by the use of high pressure and other forms of "intensified" incandescent burners. These burners differ from ordinary incandescent burners only in bringing about a better admixture of air and gas, and, by so doing, reducing the volume of the flame produced by the combustion of any given quantity of gas. It would, therefore, seem as if the flame temperature of a gas would influence its efficiency when used in incandescent burners, and should be taken into consideration as well as the calorific value. There is, however, very little difference between the flame temperatures of the different qualities of illuminating gas as ordinarily distributed, and the gases with the higher calorific values have also the higher flame temperatures. Moreover, the mantle never reaches either the theoretical or the actual temperature of the flame. Therefore, for practical purposes the efficiency of illuminating gas for use in incandescent burners may be taken as being proportional to its calorific value.

The reports and lectures referred to above can be found as follows:

The Theory of the Incandescent Mantle, by White, Russell and Traver, American Gas Light Journal, Volume LXXVI, page 413.

Lighting Power of Incandescent Mantles, by Sainte-Claire Deville, Journal of Gas Lighting, Volume LXXXIII, page 499.

The Future of Coal Gas and Allied Illuminants, Cantor Lectures, delivered before the Society of Arts, by V. B. Lewes, American Gas Light Journal, Volume LXXVIII, page 5.

The Welsbach Burner

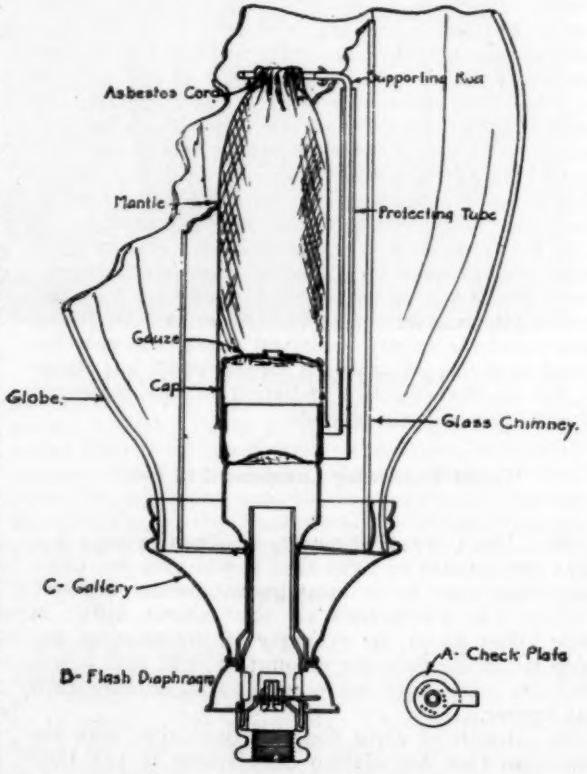
265. Give a description, illustrated with sketches, of a Welsbach gas burner.

Ans. The Welsbach burner belongs to that class of lighting devices commonly known as Incandescent Gas Burners, in distinction from the Open Tip or Open Flame Burners, and is a burner in which the source of light is not one of the component parts of the gas itself, but is a foreign body introduced into the flame (which is perfectly non-luminous) and heated till it glows.

The Welsbach burner consists primarily of rare earths, usually thorium and cerium, a web made from hard twisted, long staple cotton or Ramie fibre, both of which are natural products; or artificial cellulose may be employed.

In the upright type of mantles the most common form is now that having an asbestos loop at the top. Specially prepared asbestos cord is shirred into the top of the saturated webbing, twisted and tied to form a loop, or the asbestos cord may be tied within a metallic supporting ring, which is a continuation of the vertical side support attached to the burner cap. This side support is protected by a refractory magnesia clay tube. An additional fluid is applied to the head of the mantle for strengthening it either before or after this asbestos shirring operation. The cotton webbing is next burned away, leaving a soft, fragile, ashy structure, which is in turn hardened by being placed over a blow-pipe flame, other blow-pipe flames also acting upon the outside of the mantle. This not only hardens the ash, but gives the mantle its final form.

The mantle in this state would still be too fragile for transportation. It is, therefore, dipped in collodion, or a solution of nitrated cotton. After drying, the mantle, which up to this time has a rather ragged form at the bottom, is trimmed by special machinery, and either mounted on a supporting wire over a burner cap and gauze, or simply hung in a paper tube by means of a cord.



Upright Incandescent Gas Burner

The inverted incandescent mantle has the same ashy structure as the upright form, but the saturated web is tied to an infusible supporting ring by means of asbestos cord at the top, the lower portion of the mantle being dome shaped.

The early type of incandescent gas burners employed simple Bunsen tubes, with non-adjustable gas checks. So much difficulty was encountered in securing the proper check, and there was so much variation, that some form of adjustable check became necessary. The modern type of incandescent gas burner is provided with an adjustable nozzle or check in its base, which may, at the will of the user, be adjusted to supply the proper amount of gas until the highest incandescence is obtained from the mantle. These adjustable gas checks are divided into two (2) general classes.

The Adjustable Gas Check

The first consists of a rotatable plate, pierced with a series of holes, which may be brought to register over circumferential slots, so that from one to all of the holes may pass gas upward into the Bunsen, depending upon the gravity of the gas and upon the pressure.

The second is the adjustable needle type of check, in which the needle is attached to a block that is moved vertically by a horizontal adjusting screw. Various ingenious motions have been designed to accomplish this needle adjustment.

A typical upright incandescent gas burner is shown on the cut.

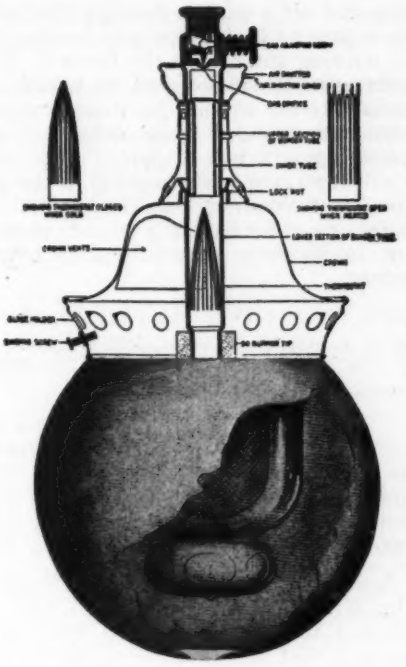
A shows top view of gas check.

B is known as the "flash diaphragm," which not only protects the air openings at the base of burner, but also engages the check plate, so that same may be adjusted by rotating B.

C is known as the "gallery," which supports the glassware. The gallery, C, carrying with it the mantle and glassware, is not fastened permanently to the Bunsen tube. It may be lifted off of the tube for cleaning purposes.

The Inverted Burner

The inverted incandescent gas burner was evolved to eliminate the shadows which were necessarily produced by the brass structure beneath the upright burner, and while the Bunsen burner is still employed, it had to be considerably modified to burn in an inverted position. It was found that the gas and air mixture would not descend as readily as it would ascend in a heated tube, and furthermore it was not desirable to place any form of permanent impedance in the flow of this mixture. At the same time, some impedance is required at the time of lighting the burner, to prevent the flame burning or flashing back to the gas check, and a thermostatic device was invented which would introduce an impedance to the flow of the mixture when the burner was first lighted, allowing the same to be lighted



Inverted Incandescent Gas Burner

easily, without rupturing the mantle, and which when warm would be automatically removed, allowing the mixture an unobstructed path, insuring perfect and complete combustion. The mouth of the burner is protected with a refractory magnesia clay tip. The crown or shell of the burner is cut away, so as to allow the products of combustion to pass off to one side. The mantle, which is fastened to a magnesia clay ring, is fastened by means of a bayonet lock provided on the tip of the burner. The mantle is surrounded by a hard glass chimney, which is provided with a safety bottom, catching any particles which might drop from the burner. This construction allows, also, complete ventilation of the mantle, but does not allow the draughts of air to strike directly upon its surface.

The cut shows a typical inverted burner in section.

Effect of Globes

266. When globes are used in connection with flat frame gas burners, what effect does the size of the bottom opening of the globe have upon the light given out by the burner? How do the various materials act in absorbing the light produced by the burner?

Ans. If the bottom opening of a globe used with a flat flame burner is made too small, the access of air to the flame is unduly restricted and the combustion of the gas tends to become imperfect. At the

same time, the air entering through the bottom of the globe acquires a high velocity in passing through the small opening and causes the flame to flicker, in some cases even to smoke, just as would an open flame exposed to the wind. For these reasons a flat flame burner surrounded by a globe with a small bottom opening will not originally yield as much light as will the same flame burning in the open air in a space free from draughts. To avoid this detrimental effect no globe having a bottom opening less than 4 in. in diameter should be used over a flat flame burner.

In King's Treatise (Vol. III, page 35) the following table is given as showing the effect of shades made of the materials named, in absorbing light when placed over a gas burner:

	Loss of Light Per Cent.
Clear glass	10.57
Ground glass (entire surface ground)	29.48
Smooth opal	52.83
Ground opal	55.85

These figures are the results of experiments made in 1860 by Mr. W. King of Liverpool. It is to be presumed that the "shades" tested were the same as globes and that the tests were made with the light in the same horizontal plane as the photometer disc. It is not stated whether the burner used was an Argand or a flat flame.

About 1880 Mr. F. W. Hartley also investigated this subject of the absorption of light by globes and gave the results of this investigation in a series of papers published in the Journal of Gas Lighting, etc. (Vol. XXXVII, pp. 54, 94, 134.) He determined the effect of globes upon the available light from both Argand and flat flame burners, and for both horizontal lighting, that is, with the photometer disc on a level with the flame, and for overhead lighting, that is, with the flame above and to one side of the photometer disc, flat flame burners enclosed by globes being usually used mainly for the illumination of objects lying in horizontal planes below that of the lights themselves. From the results of his experiments he drew the following conclusions for horizontal lighting:

Horizontal Lighting

"That a clear glass globe increases the sensible light from a flat flame.

"That globes of ground glass obstruct less light than sheets of ground glass. That the percentage loss diminishes as the light grows stronger and is for an average light 18 to 20 per cent.

"That opal globes obstruct an amount of light equal to from 33 to 65 per cent."

The increase of sensible or available light found with a clear glass globe results from the fact that the amount of light absorbed by the glass in front of the flame is more than compensated for by the extra illuminating value of the flame due to the increased steadiness secured by the use of a properly designed globe and by the light reflected from the portion of the globe behind the flame. This reflection also explains the fact that globes obstruct less light than sheets of the same material.

For overhead lighting with the light 2 ft. 3 in. above the photometer disc and distant from it 2 ft. 0 in. along the horizontal line, that is, with the disc on a line passing through the light at an angle of 41 deg. 38 min. with the vertical, he found "that glass globes with flat flame burners increased the power of the light—clear globes about 6 per cent; ground glass about 9 per cent; albatrine (a species of opal) about 23 per cent and German opal about 21 per cent."

These figures, of course, only hold for the particular angle mentioned. At this angle the direct rays falling on the disc passed through the bottom opening of the globe and were, therefore, not subject to any absorption of light by the glass, and these direct rays were reinforced by light reflected from the upper portion of the globe. Had the angle taken been such as to cause the rays of light falling on the photometer disc to pass through the globe, the absorption of light would probably have been approximately the same as that shown in the horizontal lighting experiments.

The above refers to the ordinary globes with smooth surfaces and not to globes such as the Holophane, which are specially designed to increase the amount of light given out at certain angles.

The Holophane Globe

267. What is a Holophane globe and how does it affect the useful light given by the source of light over which it is used?

Ans. The Holophane globe is a globe which diffuses the light from a light source enclosed by it in such a way as to make the whole surface of the globe appear luminous, and at the same time changes the distribution of light in vertical planes and throws a larger proportion of the total light in the direction which will prove the most useful for any particular case.

The diffusion of the light is effected by the combination of vertical corrugations on the interior of the globe, the effect of which is to spread the light horizontally, with horizontal prismatic mouldings on the exterior surface which spread the light vertically. The shapes of both the corrugations and the mouldings are carefully designed to secure the transmission of the largest possible percentage of the light through the glass, and the prisms forming the mouldings are also designed to refract as much as possible of the light in a definite direction.

(Fiftieth Installment Next Week)

HERE AND THERE IN SELLING

(Continued from page 1264)

week, the sales curve invariably indicates that the efforts are worth while.

What may be done with the "tank heater," the appliance that so many men have said cannot be displayed in an interesting and attractive manner, is shown by the photograph reproduced on this page. This display was used to tie in the direct mail advertising reproduced.

One Southern company has a commercial manager who keeps his window display different by tying it up with local affairs of all kinds, dog shows, horse and fashion shows, football and baseball games and motion picture plays that are highly advertised. They all furnish ideas for his windows and for

scenery, most of which is made with water colors, a sheet of composition board and a small saw. Again we say, for the hundredth time—keep your windows decorated—expose your merchandise, and folks will buy it.

Send the Prospect a Letter

There are a certain number of prospects who are always hard to reach, who are "out" when the salesman calls, or who "will not have time to talk to you today." These folks like to take their time; yet a well-written letter will often push them over the line. One gas company has used a letter (not a form letter) which is sent to this type of customer and which is said to produce the desired results. The latter is unusual and with the thought that it might be of use to others in the merchandising end of the business we are reproducing it below:

Dear Mrs. Blank:

We have found your range.

It's on display in our show rooms and is one of the finest examples of up-to-date workmanship that we have ever seen.

How often have you said to yourself: "I'm going to have one of those beautiful new gas ranges this summer." And then, for some reason or another, you would delay decision.

Dno't wait this time. The range is the corner stone of the kitchen, and you know, without our telling you, that the kitchen does not need mirrors to reflect the lady of the house.

The range we have chosen for you combines all the features of convenience and durability that you want. We sell only appliances that pass the rigid examination of our engineers—appliances that are built to give one hundred per cent service and satisfaction. No other but quality goods are ever displayed in our showrooms.

For your convenience, you need not leave home to purchase from us. A word from you will bring our representative to your door. And your name as a gas customer is sufficient recommendation to open a charge account.

Very truly yours,

By: _____ Sales Manager.

A SALES DRIVE FOR GAS APPLIANCES

(Continued from page 1268)

of the passerby in through, rather than stop it at the glass.

Retailers in localities where lantern slides are used in the movie theaters were supplied with slides which were a reproduction of the posters, thereby hooking the date of the exhibit week up in the minds of the prospective customer, and also served to call the window displays to their attention.

Supplementing the window trim and posters, 500,000 envelope stuffers were supplied by the Gas Appliance Society for the retailers to send to their customers.

The Allowances Used

A uniform policy among all dealers throughout the entire state was adopted and recommended by the advisory committee. There were no special sales or premiums given during the exhibit. The allowance which the committee adopted was simply an incentive for the customer to buy during the exhibit week, and was as follows:

(a) Retail merchants were permitted to make a special allowance during campaign week not to exceed $5 retail value.

(b) Said allowance to be $5 on "Cabinet" style or "Elevated Oven" type of gas ranges.

(c) Said allowance to be $5 on all automatic gas water heaters.

(d) Said allowance to be $2.50 on all "Low Oven" type gas stoves.

(e) Said allowance to be $2.50 on all gas "tank" water heaters.

(f) Allowance on all other gas equipment to be in same proportion.

These special allowances were featured in the newspaper advertisements.

The name chosen for the spring drive (Gas Equipment Exhibit for Better Homes) was adopted for the purpose of encouraging, not only an intensive temporary selling campaign, but also to serve as an introduction for the sale of gas appliances throughout the year.

All that was required from the retail dealers was to make the necessary window trims, make the proper store display, conduct demonstrations, ad-

vertise in the local press and enthuse their salesmen to sell more and better gas equipment.

Development of the Appliance Industry

Only a few years ago the gas appliance industry was viewed merely as a side line of the furniture, hardware or gas producing business. Today, by perceiving its mission, it has grown to unusual dimensions, and now measures up to the size and standards of a large and distinct industry, producing definite and necessary service to the American home.

Prominent among the causes for this rapid expansion has been the ready adaptability of gas appliances, particularly to the needs of the kitchen, and the very apparent tendency of these modern appliances to revolutionize the work of the kitchen. Housewives have realized that a great part of the work in the kitchen with the old type of kitchen equipment has been unnecessary, that better results

could be accomplished, in less time, with the logical appliances which have been perfected for the use of gas.

Use of Gas Vital Factor for Safety

At a recent meeting, held in San Francisco, of fire chiefs throughout northern California, fire prevention work and a consideration of installations constituting fire hazards was discussed.

This meeting was called at the request of the state fire marshal for the purpose of deputizing fire chiefs as fire marshals. During the day's program, among other things that were investigated from the standpoint of fire hazard, a special trip was made to several installations where gas as a fuel was utilized. This inspection trip was made under the auspices of the State Gas Appliance Society. Following the inspection trip, a special meeting was held in the gas laboratory in San Francisco, during which the Gas Appliance Society pledged its support in fire prevention work. Engineers representing the gas industry told how it was that gas as a fuel constitutes a minimum fire hazard.

It was remarked that America was built to burn, and statements were made showing that for every minute during the day, every day in the year, there is a fire in America.

During the meeting with the fire chiefs it was further brought out that of the sixteen principal causes of fire in America, those resulting from the use of gas were not included. Also, that it belonged to the class of commodities that will prevent fires, such as sparks on the roof, hot ashes in the basement and defective flues, which would be eliminated if gas appliances were used.

The recognition by fire chiefs and fire marshals that the use of gas as a fuel constitutes a minimum fire hazard is worthy of consideration by the individual as he contemplates the installation of equipment in his home—such as gas ranges, water heaters and gas furnaces.

DON'T STALL

It is human nature to stall—delay.

Another day or week will not matter, we assure ourselves.

Action precedes re-action.

We all have problems.

To solve them, we must face them.

Facing them means getting thoroughly posted and assembling all the facts in the case.

By this time, we are ready to shape up a program.

The program may call for change and work and thought and help—but what of it!

It's the people who face their problems promptly who are our leaders.

Leadership in business is not so difficult as it appears.

It means Promptness plus Action plus Good Judgment.

There never is a time when **everything** is clear sailing.

In the months ahead, there will be increased prosperity—the stage is set for it.

But some people will continue to grumble about hard times and general conditions.

How much prosperity we actually manage to corral will depend largely upon ourselves.

A lot of folks will stall—make excuses.

Others will go ahead—and make good.

What was **that** which you ought to have done today?

What is the most important duty and problem facing you tomorrow?

Don't stall.

You'll be surprised how the Hill of Difficulty disappears when you begin to climb it.

Forward march!

FUEL OF THE FUTURE—WHAT SHALL IT BE?

(Continued from page 1262)

which make it more advisable to treat each metal by itself than to consider them as a whole. Therefore, our first task is to define and describe the principles and operations of the heat treatment of steel, which is, of course, the most important metal from this standpoint, as well as from many others, that the modern manufacturer and engineer has to do with.

Steel may be heat treated by simple heating operations and then again it may be heat treated by a combination of heating and the chemical action of certain substances. In other words, the effects of heat treatment may be purely physical or they may be physico-chemical as well. There are many different effects that are produced by heat treatment, such as annealing, hardening, case hardening, case carburizing and tempering and toughening, and each will be discussed in turn in this and the following articles on this subject.

Steel, Its Structure and Properties

It is first necessary to understand what steel is and what its properties are before it is possible to consider the changes that can be induced in it by heat treatment. Steel is, of course, the product that is made from pig iron by burning out the impurities that it contains, these being principally carbon, phosphorus, sulphur and silicon. This is accomplished in an operation which is carried out in a Bessemer converter or an open hearth furnace. It is interesting to note that in the latter case the fuel used is gaseous in nature.

The removal of these impurities changes the metal pig iron, which is not strong, very brittle and inelastic, to a product which possesses great strength, is not brittle and is highly elastic, tough and able to withstand the greatest mechanical wear and tear. The product is undoubtedly one of the most important and most vital substances on which modern civilization is built.

Improving the Properties of the Steel

While it is true that the steel possesses all these advantageous properties, it is still necessary further to treat the steel in order to improve its quality and increase the degree to which it is ductile, hard, tough, etc. This is done by the operations of heat treatment. The principal properties of the crude steel, that are affected in this way, are its strength, its elongation, its ductility, endurance, fatigue, resistance to rotary bending, resistance to impact, its hardness and its resistance to wear.

Why Must Steel Be Heat Treated?

Take, for example, the steels that are employed in the automobile industry, in the manufacture of parts used in the construction of automobiles. Thus, for example, the frame of the machine must be able to withstand vibratory stresses occurred when riding over rough roads. Of course, it must also be strong and tough, but while the original steel may possess the required degree of strength and toughness, it would not be able to stand up against the chocks received in riding over rough, bumpy roads. Hence, in order to enable the steel to withstand such shocks, it must be heat treated. Other parts of the machine must also be built to stand up against particularly severe treatment. This pertains especially to the front and rear axles, the steering parts, the springs, the gears, etc. All of these parts must possess extraordinary great mechanical strength in one way or another, and it is only possible to give steel the required properties by subjecting it to the different processes of heat treatment. Besides the automobile, there are also many other parts of machinery, tools, implements, knives and numerous other articles that must possess certain special properties which are acquired only through heat treatment.

Definition of the Properties of Steel

To understand the results of heat treatment, it is necessary to define the properties of steel which are affected by this process. Tensile strength is simply the resistance of the steel to a load that is static, that is not in the nature of a shock or a vibration. It tends to pull the particles of the metal away from each. Elongation is directly related to tensile strength and is the amount of the stretch that takes place in the metal when it is pulled apart by tension; it is measured in per cent of the original test section. Compressive strength is the resistance of the metal to compression or crushing, and torsional strength is its resistance to twisting.

The ductility of steel is defined to be the amount of distortion that takes place in the metal before final rupture. It is measured by the percentage elongation and the percentage reduction in the cross-sectional area of the sample at the point of rupture.

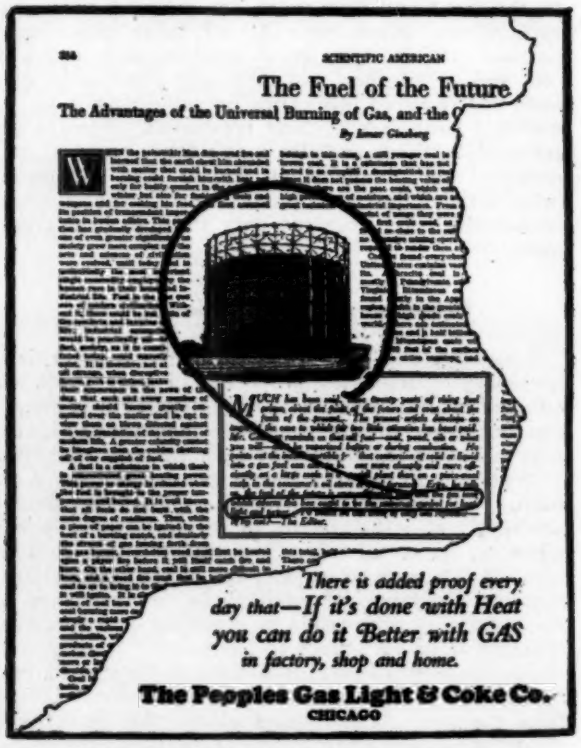
Endurance is an important property of steel. An important point in the testing of all metals is introduced by the fact that the metal is seldom asked to withstand the maximum loads to which it may be subjected without rupture, but is being subjected to repeated smaller loads which, because of the great number of these repetitions, have a marked effect on the metal, although each individual application of the load may be far below the maximum strength of the metal. It is held that these repeated small loads finally result in a disruption of the structure of the metal which gradually weakens it and causes what is known as fatigue.

Sudden Loads

While a metal, such as steel and others, is asked to withstand constant load applied statically, it is also called upon to resist shocks and suddenly applied loads. These dynamic loads are of equal, if not greater, importance than the static loads, and

one of the principal functions of heat treatment is to assist the metal in resisting the dynamic loads. To test the ability of the metal to withstand shock, the drop test is used, which consists in subjecting the metal to the blows of a hammer or to the effect of a known weight dropping from a known height.

The impact test is also employed for this purpose, and serves to detect brittleness in the metal. This is a quantitative test in contradistinction to the drop tests, which are only qualitative. In the impact


SCIENTIFIC AMERICAN
The Fuel of the Future
The Advantages of the Universal Burning of Gas, and the
There is added proof every day that—If it's done with Heat you can do it Better with GAS in factory, shop and home.
The Peoples Gas Light & Coke Co.
CHICAGO

"Fuel of the Future" in Advertisement

test the metal is notched and the load required to break the test sample is determined and recorded as its resistance to shock. The heat treatment has a very marked effect on this test, but when the steel contains chemical constituents, such as phosphorus and sulphur, which render it basically brittle, then heat treating the metal will be of little avail in making it able to withstand shock. The important point in this consideration is to use a metal which originally does not contain much phosphorus or sulphur.

Fatigue Under Impact

Just as in the case of static loads, impact loads may be applied which are in themselves not great enough individually to break the sample, but when repeated an indefinite number of times finally result in the rupture of the metal. The fatigue of metals to shock is perhaps of even greater importance than its fatigue to slowly applied stresses, for the metal breaks more easily upon repeated shock loads, and, furthermore, the shock loads approximate better the conditions that the metal has to meet in actual usage. Thus the bumping of the motor car over rough roads and the passages of car or locomotive wheels over rail joints are cases of impact stresses frequently applied, each being considerably less than what is required to break the metal. Here, again, is where heat treatment is of considerable value in enabling the metal to stand up against these severe strains.

Hardness of the Metal

The hardness of steel is a property which is in a certain way allied with its mechanical stress and it is one which is of considerable importance from certain aspects and furthermore it is one which is affected in a marked degree by heat treatment. Hardness is simply the property of the metal which gives an idea of the ease or difficulty wherewith it is penetrated. A hard substance will penetrate a soft substance and will itself resist penetration of the latter. There are various kinds of hardness, such as tensile hardness, cutting hardness, abrasion hardness and elastic hardness.

The Brinnel test for hardness is perhaps best known and it yields a relative factor which, when applied to any steel, indicates clearly how hard it is in accordance with a set scale.

The ballistic test indicates the dynamic hardness of the metal. It is carried out to determine how much penetration will be occasioned by violent impact of a pointed tool with the surface of the metal. The hardness of the metal from the standpoint of abrasion gives an idea of the wearing qualities of the same. Resistance to abrasion is important in the case of rails, rotating parts of machines and the like. Heat treatment is of great importance from this standpoint, as the resistance of the metal may be materially increased by such treatment.

The Structure of Steel

It is, if course, necessary for the heat treatment specialists to have a very intimate knowledge of the structure of steel, its crystallography, and the effect that heat treatment has on this structure and the relation that exists between the structure of the steel and the various properties of the metal that have just been discussed. But as far as the gas engineer is concerned, he is not required to have such a comprehensive knowledge of this matter, but he should know what is meant by the crystalline structure of steel and understand in a general way what steel is and how heat treatment may change its structure.

It has been said before, or rather intimated, that steel is not a simple substance such as copper or zinc, but a composite substance, consisting principally of an alloy of iron and carbon, mixed with

varying but small percentages of impurities, such as silicon, phosphorus and sulphur. It can, of course, contain other metals, such as nickel, chromium, manganese, etc., which are added intentionally to create certain advantageous effects in the steel by actually alloying it with these metals.

Steel has been aptly described by Bullens in his book on "Steel and Its Heat Treatment" as being like a granite, that is to say, being made up of a number of individual grains or "minerals" corresponding to the quartz, mica and feldspar of the granite. Thus, in steel that has been cooled down slowly from a high temperature, there are found the following alloys: ferrite, cementite and pearlite. A considerable amount of investigation and study has been made of these constituents of steel and it has been possible within certain limitations to assign actual formulae to them. Steel may be considered as being made up of varying quantities of these alloys, which can be found in different proportions in the metal just as mica, quartz and feldspar are found in different percentages in granites.

Carbon Alloys and Properties of Steel

The formation of these alloys in the steel has considerable to do with the properties of the steel, and the principal factor that controls their formation is the rate at which the hot steel is cooled down. Not only is the percentage of these ingredients of the steel important in determining its physical properties, but their arrangement within the internal structure of the metal is also of considerable significance. The study of the crystallography of steel and its microstructure is based to a large degree on the determination of the distribution of these crystals throughout the steel and the amounts of them found in it.

The relation between these ingredients and the properties of the steel may readily be understood from the fact that pearlite, for example, possesses considerable hardness, while ferrite is a comparatively soft substance. The latter, however, possesses high electrical conductivity and is magnetic. On the other hand, ferrite does not possess great tensile strength, while pearlite is strongest of all the ingredients and has the maximum ductility. Cementite is the ingredient that adds hardness and brittleness to the steel and hence lowers the tensile strength.

Relation Between Ingredients and Heat Treatment

The fact that the manner in which the steel is cooled down after being heated to high temperature has an important bearing on the proportions with which these ingredients are present in the steel clearly indicates the significance of heat treatment and points out just how it can affect the final properties of the metal. After all, the principal effect of heat treatment is physical, and the principal change that takes place is in the structure of the metal and the structural arrangement of the various ingredients of the steel. This is brought about by different methods of conducting the operations of heating and cooling.

The exact nature of these changes and the proper understanding of the phenomena that takes place require a very intimate knowledge of the mechanism of the structural characteristics of steel and of the science of crystallography. Such a knowledge is not required by the gas engineer, but he should know that the application of heat and the regulation of the cooling operation are what change the properties of steel, improve its wearing qualities and in general enhance its value for many purposes through the effects that these processes have on the proportions of the various crystalline ingredients of the steel. The details of these changes need not be considered here, as they belong primarily in the province of the metallurgist. It is interesting to know, however, the conditions of both the heating and cooling operations are of marked effect on the changes that take place in the crystalline structure of the steel, which explains the various heat treating processes that are carried out on the metal and also the fact that so many different results and effects can be obtained from them.

Effect of Mechanical Treatment

Furthermore, it must be remarked that these changes are also brought about to a certain extent by mechanical operations performed on the metal in conjunction with heating. Thus, for example, in the process of forging it is both the mechanic work and the heat treatment that causes the changes in the properties of the steel to take place. The gas engineer must also be acquainted with the general details of this process and of the others in which a combination of heating and mechanical treatment is employed to enhance certain qualities of the metal, just as well as the straight heating operations in which no mechanical operations are performed on the metal.

Before leaving this general subject it must be mentioned here that all these operations require precision. Exact control of the temperature and of the general furnace conditions must be exercised the proper results are to be obtained. This is why gaseous fuel can enter the field with everything to its advantage, for it is a fuel which can be readily controlled. It is as easy to regulate as electricity, which seems to be the standard of comparison in this field.

Current Market Prices

COALS (By Courtesy of Coal Age)
A. Bituminous.

(Spot prices, F. O. B., mines, net tons).

High Volatile, Eastern	Market	Price
Pool 54-64 (Gas Standard)	New York	$1.40 to $1.65
Pittsburgh screened gas	Pittsburgh	2.30 to 2.50
Pittsburgh gas, mine run	Pittsburgh	2.00 to 2.25
Kanawha lump	Columbus	2.10 to 2.50
Kanawha mine run	Columbus	1.45 to 1.65
West Virginia lump	Cincinnati	2.50 to 2.75
W. Virginia gas mine run	Cincinnati	1.35 to 1.60
Midwest		
Indiana 4th vein lump	Chicago	3.00 to 3.25
Indiana 4th vein mine run	Chicago	2.25 to 2.50
South and Southwest		
Big Seam lump	Birmingham	2.75 to 3.50
Big Seam mine run	Birmingham	1.50 to 1.90
Southeast Kentucky lump	Louisville	2.50 to 3.00
Southeast Kentucky mine run	Louisville	1.50 to 1.75

B. Anthracite.

(Spot prices F. O. B. mines, gross tons).

	Market	Freight rates	Independent	Company
Egg	New York	$2.34	$8.25 to $8.75	$8.75 to $9.25
Egg	Philadelphia	2.39	9.45 to 9.75	8.80 to 9.25
Egg	Chicago (net tons)	5.06	8.17 to 8.25	8.14 to 8.20

COKE (By Courtesy of Iron Trade Review).

Connellsville, furnace	$3.25 to $4.00
Wise County, furnace	3.75 to 4.00
Alabama, furnace	4.25 to 4.50
Foundry, Newark, N. J., del	10.41
Foundry, Chicago, ovens	10.75
Foundry, Boston, delivered	11.50
Foundry, St. Louis	11.00
Foundry, Granite City, Ill	9.00
Foundry, Alabama	4.50 to 5.00

PETROLEUM (By Courtesy of Oil, Paint & Drug Reporter)

(Prices at wells, per bbl)

Pennsylvania—Ohio—West Virginia.	
Cabell, West Virginia	1.45
Corning, Ohio	1.50
Lima	1.38
Pennsylvania	$2.75 to 2.85
Wooster, Ohio	1.40
Indiana—Illinois.	
Illinois	1.37
Indiana	1.38
Oklahoma—Kansas.	
Mid-continent (low gravity)	.75
Gulf Coast.	
Gulf Coast, Grade A	$1.50
Gulf Coast, Grade B	1.25
GAS OILS.	
Gas Oil, Bayonne, bulk gal	5¼c
Gas Oil (32-36) Oklahoma, gal.	2¾ to 3 c
Gas Oil (32-36) Gulf Coast, gal	3¾ to 4 c

PIPE AND FITTINGS—CAST IRON GAS PIPE.

(By Courtesy Iron Trade Review.)

Four-inch, Chicago	$56.20 to $57.20
Six-inch and over, Chicago	52.20 to 53.20
Four-inch, Birmingham	49.00 to 50.00
Six-inch and over, Birmingham	45.00 to 46.00
Four-inch, New York	65.50 to 66.50
Six-inch and over, New York	60.50 to 61.50
Standard fittings, Birmingham, base	115.00

6 to 24-inch, base; over 24-inch, plus $20; 4-inch, plus $20; 3-inch, plus $20

BY-PRODUCTS

(By Courtesy of Oil, Paint and Drug

Ammonia aqua, 16 deg. drums lb	5 to 5¼c
Ammonia aqua, 20 deg. drums lb	6¼ to 6½c
Ammonia aqua, 26 deg. drums lb	6½ to 7 c
Ammonia squa, anhydrous cylinder, lb	30 to 36 c
Ammonium sulphate, bulk F. O B. Works, per 100 lbs	$2.70 to $2.80
Potash prussiate, yellow casks, lb	16½ to 16¾c
Potash prussiate, red casks, lb	37 to 38 c
Soda prussiate, yellow casks,	9¼ to 9½c
Soda sulphocyanide, barrels, lb	45 to 55 c

COAL TAR BASIC PRODUCTS.

(By Courtesy of Oil, Paint and Drug Reporter)

Benzol C. P. tanks, works, gal	24 to 25c
Benzol, drums, gal	30c
Benzol, 90% tanks, works, gal	23c
Benzol, 90% drums, gal	28c
Napthalene, flake, barrels, lb	5½ to 6 c
Napthalene, dyestuff bags, lb	5 to 5½c
Solvent Naphtha, water white works, gal.	24 to 25c
Solvent Naphtha, drums, works, gal	29 to 30c
Toluene, C. P. tanks, works, gal	31c
Toluene C. P. drums, works, gal	36c

Coal

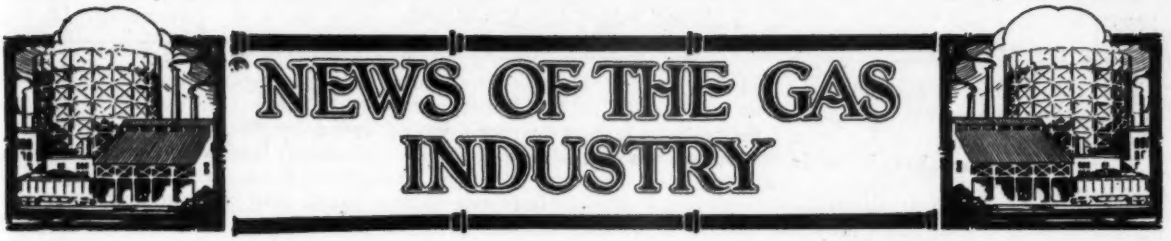
Production of bituminous coal during the week ended Nov. 29, according to the Geological Survey, was 9,646,000 net tons, a decline of 913,000 tons from the total for the preceding week, when 10,559,000 tons was produced as shown by revised figures. Despite the decline, however, production surpassed that of the corresponding week of last year for the third successive time.

Crude Oil

Crude oil output again increased in the week ended November 29, going up 12,200 barrels daily. The American Petroleum Institute reported average gross crude oil production in the United States for the week ended November 29 was 1,975,800 barrels, as compared with 1,963,600 barrels for the preceding week, an increase of 12,200 barrels.

Gas Oil

The market was displaying more strength on all grades. Gas oil was ¾c per gallon higher at 5¼c per gallon in bulk, f. o. b. New Jersey terminal. Diesel oil was advanced 10c per barrel to $2.10 per barrel, f. o. b. Bayonne terminal, with an improved demand noted. Gas oil was likewise showing more strength, under improved buying. The production of fuel and gas oils in California during October, according to the Bureau of Mines, was 373,529,771 gallons, an increase of 17,942,082 gallons over September output. Stocks on October 31 were 774,127,958 gallons, an increase of 4,245,383 gallons over September stocks.



Pennsylvania Gas Association Hold Their Annual Meeting

Large Attendance and Interesting Papers Mark Reading Meeting

The mid-year meeting of the Pennsylvania Gas Association was held December 4, at the Berkshire Hotel, Reading, Pa.

The meeting was called to order by John A. Frick, president. In his remarks he called attention to the great value of the meetings of state associations, due to the fact that the American Gas Association has grown to such proportions that at its annual meetings only a very few can enter into the discussions, whereas in the meetings of the state associations all can take part in the discussions, and the subjects can be of interest to practically all attending.

Resolution on Death of John H. Keppelman

Since the last meeting of the association has occurred the death of Mr. John H. Keppelman, former president, and one of the founders of the Pennsylvania Gas Association, and the following resolutions were unanimously adopted and made a part of the minutes.

Resolution

John Henry Keppelman, born in the City of Reading, Pa., February 16, 1853, crossed the border on the ninth day of August, 1924, to the great and mysterious beyond and took refuge with the Great Ruler of the universe.

Mr. Keppelman became associated with the gas industry in 1885, and gave unsparingly of his time, energy and ability to such measure that he won the esteem and respect of employer and employees and all others who had the good fortune to come in contact with him.

Further, he had a great feeling of love for his home community and his fellow citizens. This feeling was reciprocal, for on occasions the people of the city of his birth conferred upon him honors that come not to many.

To know him was to immediately respect, honor and cherish him.

Therefore, be it resolved, That the Pennsylvania Gas Association, in session assembled, expresses its appreciation of opportunity of association with a life usefully spent and left as a heritage to those who loved him the remembrance that effort gains its reward in an everlasting friendship even after death.

The first paper on the program was entitled "Chrisman Down Run Process," by L. W. Seltzer, Consumers Gas Company, Reading, Pa. The facts presented in this paper were taken from actual operating conditions and were very freely discussed by the gas men present. The paper will appear in a near issue of the American Gas Journal.

Labor Saving Devices

Mr. A. M. Boyd, of The United Gas Improvement Company, read a paper entitled "Labor Saving Equipment Available for Distribution Work by Gas Companies." His paper was very largely a description of the work of trenching machines and refilling machines, operated under various conditions, and was illustrated by a moving picture of various types of machines in operation.

Mr. Joseph Lucena, superintendent of gas distribution of the Syracuse Lighting Co., Inc., Syracuse, N. Y., read a short paper entitled "More House Heating," and explained some of the operations of his company along this line. This paper will also be published in a near issue of the American Gas Journal.

Educational Work

Mr. W. Griffin Gribbel, chairman educational committee, Philadelphia, Pa., made a brief report of the activities of his committee. He explained that they had anticipated some difficulty in getting the various colleges and universities of the state to take up the matter of a course of lectures on the various phases of the gas industry, but that, much to his surprise, the committee met with splendid cooperation, and that a large number of lectures were delivered by prominent men in the industry to students, and that right now they have received so many requests for additional talks on this subject from the various educational institutions that they are having some difficulty in supplying the demand. The following is quoted from Mr. Gribbel's report:

"It was the purpose of the committee to have lectures delivered before particularly the students of institutions of higher learning, the universities and colleges, lectures covering the field of public utilities in general, the methods of manufacture and distribution of gas, rate structure, state commission regulation of utilities, public relations, accounting, and in fact all matters of interest and value to the students. The committee had two reasons in mind in presenting such lectures. First, to interest college men in choosing the gas business as their vocation. Second, to instill in their minds a general knowledge of the gas business, its manner of doing business and its problems, to the end that should the future find them charged with authority, these prior impressions of the stability and earnestness of our industry would preclude hasty judgment.

"The gas industry has been accorded recognition in the regular curriculum of engineering and chemistry courses; and the willingness of our association to be of service has come to the notice of some of the leading colleges and universities. We have possibly in-

clined many fine young men to our industry who would have gone elsewhere.

"Your committee has been in direct touch and has co-operated with the Illinois Public Speakers Bureau, which is sponsored by the three Illinois public utility associations and has been inspired to further the Illinois idea through the colleges and universities of the country. Mention should also be made of the fine results from similar work by the Texas Public Service Information Bureau."

The committee was entertained at luncheon by the Consumers Gas Company of Reading and was addressed by Mr. J. Arthur Keppelman. He mentioned particularly his thoughts on public relationship and stated as follows:

Perhaps all public utility men would not be in accord with so broad an assertion as I am about to make regarding public relations, and I would quite naturally defer to the judgment of those whose experience has been greater than mine. I venture to say, however, that a survey by a grievance committee would trace the vast majority of consumers' troubles to unhappy public relations. I would venture to say also that in these days of customer ownership a large proportion of the public has been enlisted as supporters instead of critics of public utilities. I would venture to say, furthermore, that the tremendous public investment in utility properties, which has increased at such an astonishing rate in the past few years, has brought the public into such close relation with utility properties that part ownership is at once an investment and a blessing.

No other conclusion can be possible than that if the services of experts, including engineers and lawyers, the management of operatives, advertising and promotion for new business, and the inexhaustible field of public relations are appraised at their respective values, happy public relations will be found by all odds the most important. Show me the property which has happy public relations and I will show you the property which is successful.

A property living at peace with the public is taken at more than its face value. The factor of public confidence is the counter-irritant to matters which would otherwise be subject to criticism. A popular property seldom has complaints of a serious character, has no trouble in disposing of its securities across the country, does not find commission management essential, has no difficulty with its franchises, does not find its efforts to extend service into new territory made difficult by burdensome restrictions, and does not have to regard its rate schedules as a source of constant criticism.

In these modern times, the public, which a previous generation damned, has become a powerful factor in management possessed of a right, intangible, but nevertheless real, to say how we shall manage our properties. While the public draws no dividends and takes down no interest, it has almost the managerial rights of stockholders.

If the balance sheets of industrial corporations show profits they are of no interest to others than stockholders, but the profits of a public utility, if too high, are followed by rate reductions, not by the advised action of board of directors, but substantially at the will of the public. A factor so potentially important cannot be overlooked, and must not be relegated to that class of elements in public utility management which it has been more or less fashionable in past years to damn.

Other addresses made at the luncheon included one by Mr. Paul E. Fickenscher, bureau chief, rates and tariffs, Public Service Commission, Harrisburg, Pa. Mr. Fickenscher pointed out to the gas men that a utility company was protected by the laws of the state against competition in their communities, therefore good business judgment should dictate that the utility men should forget that part and render service adequate to the customers' needs.

Major J. S. S. Richardson, director Public Service Information Bureau, in a short talk, stressed the popular favor of the utility securities. He stated that in 1922 the public took 80,000,000; in 1923, 175,000,000; and that it was expected in 1924 that it would reach the enormous total of 300,000,000.

Another interesting paper was read by Mr. F. C. Weber, Public Utility Division, Henry L. Doherty & Co., New York City. This paper will also appear in a near issue of the American Gas Journal.

The meeting was attended by about 150 gas men, and was one of the most interesting one-day meetings that the association has ever held.

A. G. A. Committee Meetings

The following committee meetings of the American Gas Association are scheduled for the first part of this month at association headquarters:

Insurance Committee—Thursday, December 11, 10:30 a. m.

Carbonization Committee—Monday, December 15, 2 p. m.

Water Gas Committee—Tuesday, December 16, 2 p. m.

Committee on Education of Gas Company Employees—Wednesday, December 17, 2 p. m.

Miss Mary Dillon General Manager of Brooklyn Boro Gas

A business honor, seldom accorded a woman, was won by Miss Mary E. Dillon when the Brooklyn Borough Gas Company of Coney Island recognized her 21 years of service and took her into the firm as vice-president and general manager. Miss Dillon had been local manager for several years.

Entering the employ of the company in 1903, Miss Dillon worked her way up through all the grades until she had under her control more than 1,000 of the company's employees. She is an authority on the gas industry and has made many speeches on the subject before bodies of technical experts.

Miss Dillon was the first woman to address a convention of the American Gas Association.

During the last ten years the Brooklyn Boro Gas Company has twice doubled its output. It is now capitalized at $5,000,000 and has erected a new $300,000 building at 17th street and Mermaid avenue.

Geneva Gas Co. Organized

Melstone, Mont.—What may develop into a business enterprise of considerable magnitude was launched when the Geneva Gas Company was organized by A. D. McConnell of Buffalo, N. Y., for the purpose of furthering the possibilities of installing a coal and gas retorting equipment at the town of Geneva, commonly known as Absher, and the nearest rail point to the Carpenter Creek coal mine. It is the plan of the new company to install a complete retorting plant at this point as soon as possible, together with equipment to handle the most important of the by-products.

Clare N. Stannard Honored

Mr. Clare N. Stannard, vice-president and general manager of the Public Service Company of Colorado, has been elected a member of the board of directors of the Denver Tourist Bureau. The purpose of the bureau is to make the visit of the tourist a more enjoyable one, and incidentally the more tourists, the more business. A case of mutual aid.

Contracts Awarded

The Manchester Traction, Light & Power Company has decided to install additional purifying capacity at its Nashua, N. H., plant, and has awarded the contract to the U. G. I. Contracting Company, Philadelphia, to furnish and install the equipment, which will consist of three 18 ft. by 14 ft. 4 in. circular steel purifiers, together with a 16 in. gas manifold, steam coils and lagging.

In addition to this equipment, the U. G. I. will also install a 5 ft. high duty condenser and a large amount of yard connections in various parts of the plant.

In addition to the other work that it is doing at the Hudson plant of the Eastern New York Utilities Corporation, the U. G. I. Contracting Company is installing a tar separating system, also a water circulating system, as well as building to house the moving machinery and a new steel and concrete roof over the generator house.

Contract Awarded

The Detroit City Gas Company, of Detroit, Mich., recently placed a contract with the Western Gas Construction Company for a quantity of welded steel pipe, which is now being installed at that plant.

Marinette Gas Rate Increase Approved

Madison, Wis.—Increase in gas rates at Marinette was granted by the State Railroad Commission to the Menominee and Marinette Light & Power Company. The commission fixed the maximum gross charge at $1.70 per 1,000 cubic feet and the minimum at $1.02. The minimum monthly charge was set at $1.

The Public Service Company of Colorado and Its Gas

While there has been a tentative budget formulated by the Public Service Company of Colorado for the next six years, the total expenditures to be over $12,000,000, there may be many things to alter it one way or the other. The large sum includes gas and electricity. Taking gas alone for the year 1925, we find that it has agreed to spend $796,279, distributed as follows: $258,698 for construction work in Denver; $156,500 for new holders and $381,081 for other distribution construction. Should the natural gas output at Fort Collins warrant it, $500,000 is ready for a pipe line from Fort Collins to Cheyenne, Wyoming.

For the years of 1926 and 1927 about the same amount is specified for the gas department. With an abundance of natural gas unearthed, or a failure of the natural gas already found, there will, no doubt, be need for a revision.

Pension for Employees

Announcement has just been made by A. B. Macbeth, vice-president and general manager of the Southern California Gas Company and the Midway Gas Company, that these companies have just adopted a pension system covering their employees. The fundamental principles of the pension plan differ from those established by other companies. They cover the employees eligible by an insurance policy which provides pension upon the attainment of age 65, disability benefits in case of total disability, insurance payable to dependents in case of death, and a cash value which is paid to employees upon leaving the company in proportion to the number of years' service and salary received. Maximum pension to be given under this plan will be $2,100 a year, and the minimum, for those who have served 30 years or longer, will be $840 a year. For a shorter period of service the pension is proportionately less.

Los Angeles Chamber of Commerce Home to Heat With Gas

Arrangements have just been completed with the Southern California Gas Company whereby the new Chamber of Commerce building in Los Angeles will be heated by automatic gas-fired boilers. It is believed that this will be the largest building in the world heated in this way. It surpasses in size the previous record established by the Brownstein-Louis building, which was put on our lines some time ago. At that time considerable interest and attention were given to the installation throughout the gas world, as the use of gas in this way was an extension of previous practices. The results since the installation have been so pre-eminently satisfactory and economical that other progressive builders are interesting themselves in this method of using gas as fuel. In addition to heating the building, through 40,000 feet of steam radiators, 3,000 gallons of hot water a day will be supplied from this heating unit.

Customer Ownership Sales

Net customer ownership sales of preferred shares at the operated public utility properties of Standard Gas and Electric Company for the month of November totaled $2,319,600 par value, there having been 4,237 separate transactions.

35-Acre Site Purchased by Gas Company

The customers of the Brooklyn Union Gas Company are to have the largest gas service department in the world. This structure is to be erected on 35 acres purchased by the Brooklyn Union Gas Company.

The gas service department of the Brooklyn Union Gas Company has been gathered together at this point to facilitate the service to customers. The necessity for the consolidation is caused by the growth of Brooklyn and like growth of the gas company.

There will be installed shops for the preparation of equipment for the consumers' homes. This station will be practically the heart of the service of the Brooklyn Union Gas Company and its associated companies. It will be equipped with a telegraph typewriter system which will reach out to the various branches of the company throughout the sections which it serves. In this way an order received by phone can be instantly transmitted to the shop office for attention.

There will be storage facilities for automobiles of the company. The automobiles will be constantly kept available for prompt and efficient service to the customer. There will also be storage for gas appliances of every kind and description. This will enable the customer to get a wide selection of appliances. There will also be kept here parts of gas appliances, so that a customer may get such parts as he desires in Brooklyn and secure prompt attention.

There will also be on this place a meter shop with a capacity to provide for the needs of 650,000 homes, a storage warehouse for firebrick, castings, pipes, stationery and all kinds of material that may be needed in the transaction of this business. There will also be a vault for the safeguarding of the records of the company.

The buildings on the property now will be made useable and put into service as soon as they are conditioned. There are ten acres of buildings on this property and additional room is provided for the extension and growth of the business.

The company also contemplates maintaining an athletic field for the men of the company, with tennis courts, baseball and football fields and general clubrooms and restaurant for the use of employees.

There will be constantly employed between 500 and 750 men. This company unquestionably will add to the prosperity of the community in which the station is located.

Fitchburg Gas Co. Holds Meeting

Fitchburg, Mass.—Harold B. Wood of Philadelphia, an officer in the American Educational Association, was recently the principal speaker at the meeting of the Fitchburg Gas & Electric Light Company Club in the C. of C. hall. The address, one of the most interesting and instructive of the many given at the club meetings, was one of the features of a program that held the attention of a large audience. The committee in charge provided an exceptional program of short talks, an entertainment, a supper and dancing.

The guests included Ralph S. Drury, F. H. Sprague, W. C. Kimball, John C. Dexter and Leon Fields. President Edward B. Ryan, superintendent of gas distribution, presided.

The supper, which was served by a committee from the gas department under the direction of Stephen Vallee, was an excellent one. It was followed by short talks by A. G. Neal, assistant manager, on safety and accident prevention work. The company intends to continue this work and organize more first-aid and accident prevention classes. There are 78 employees, including five girls, now capable of conducting first-aid work.

F. S. Clifford, chairman of the public service committee, spoke on courtesy.

H. E. Crawford of Dana, an entertainer, gave excellent readings which proved very entertaining and amusing. Francis L. Bail, manager of the company, spoke briefly on the education of the employees, and also read an essay.

Mr. Wood had years of experience in the steel shop, machine shop, tempering, drafting, engineering, salesman, sales manager up to vice-president of a $1,500,000 company, making elevating and conveying machines.

Mr. Wood said that during the war the plan was started of getting the best rules, which helped big business men, captains of industry and others, and then present them in such a way that they would help thousands of others to become more successful.

He said that employees would do the right thing if they understood the right. The trouble comes when they do not understand.

Executives of Operated Utilities Elected on Standard Gas and Electric Board

Standard Gas and Electric Company took the first steps in a new policy of broadening executive responsibilities in the operation of subsidiary companies when, at the regular meeting of the board six operating executives were elected members of the board. The executives are vice-presidents and general managers of some of the large utility companies supervised by the Byllesby Engineering and Management Corporation, which they represent at the properties concerned. They include men associated with Byllesby enterprises for many years. In working out the new arrangement, it was necessary to increase the directorate from 17 to 23 members.

The operating executives elected to the board are T. K. Jackson, president, Mobile Electric Company; W. F. Raber, vice-president and general manager, San Diego Consolidated Gas and Electric Company; R. F. Pack, vice-president and general manager, and H. H. Jones, vice-president in charge of operation, Northern States Power Company; J. F. Owens, vice-president and general manager, Oklahoma Gas and Electric Company; and Samuel Kahn, vice-president and general manager, Western States Gas and Electric Company of California.